REMARKS

Claims 1-2, 4, 6-10, 12-14, and 16-17 are pending after entry of this paper. Claims 1-3, 5-15, 17 and 18 have been rejected, and claim 4 and 16 have been objected to. Claims 3, 5, 11, 15, and 18 have been cancelled without prejudice. Applicants reserve the right to pursue cancelled subject matter in a continuing application.

Claims 1, 6-7, 9, 12-13, and 17 have been amended. Support for the amendments to claim 1 may be found throughout the instant specification and the claims as originally filed, for instance in original claim 5 and at page 3, line 29 – page 4, line 3. No new matter has been introduced by these amendments.

Reconsideration and withdrawal of the pending rejections in view of the above claim amendments and below remarks are respectfully requested.

Response to Provisional Non-Statutory Double Patenting Rejection

Claims 1-3, 5-15, and 17-18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 5-9, and 11-16 of copending Application No. 10/533,758. Since the conflicting claims have not in fact been patented, this is a provisional obviousness-type double patenting rejection.

Applicants submitted a terminal disclaimer and paid the required fee with the August 11, 2008 response, which renders moot the obviousness-type double patenting rejection. Withdrawal of the rejection is respectfully requested.

Response to Rejections Under 35 U.S.C. § 103

The Examiner has rejected claims 1-3, 5-15, 17 and 18 under 35 U.S.C. § 103(a) for allegedly being obvious over U.S. Patent No. 4,015,099 ("Seniuk et al.") in combination with U.S. Application Publication No. US2002/0100694 ("Morin et al.") and U.S. Patent Nos. 4,043,893 ("Gelfand"), 4,035,280 ("Deane et al."), and 4,246,321 ("Shibata"). The Examiner states that Seniuk et al. discloses an aluminum headbar with a copper contact button in the ends, where the copper contact button is coated with silver. The Examiner specifically notes that Seniuk et al. "does not disclose [that] a metallurgical bond is formed between the aluminum support bar and the electroconductive coating material," suggesting that the Examiner believes that Seniuk et al. discloses each and every element of independent claims 1 and 13 except for a metallurgical bond between the aluminum bar and coating material. Applicants disagree with this implicit contention. The Examiner goes on to describe various teachings of each of the remaining references, discussed in turn below. The Examiner alleges that the subject matter as a whole would have been obvious even though Seniuk et al. does not disclose a metallurgical bond being formed because the remaining references allegedly show that it is known to use a metallurgical bond to create good electrical contact, and further that silver, copper, and tin are known to be used to make such electrical contact (specifically pointing to Morin et al. regarding the use of silver copper alloy to make good electrical contact on aluminum devices). The Examiner also contends that "the manner in which the contact materials are deposited would be within the ability of the person having ordinary skill in the art and art considered to be conventional methods for applying such materials to surfaces." Applicants respectfully disagree, for the reasons set forth below.

Seniuk et al. is directed to a method of joining a copper contact button to an aluminum headbar of an electrode plate (abstract). The method of Seniuk et al. involves the coating of a copper button with thin layer of silver (abstract, col. 1, lines 53-63). The coating takes place by dipping the copper button in a bath of silver cyanite for 3-5 seconds (col. 3, lines 17-20).

Seniuk et al. does not teach the coating of the aluminum headbar with an electroconductive coating material. Claim 1, however, recites a method for the formation of a contact surface on an aluminum support bar [headbar] comprising "forming a highly electroconductive layer on at least one end of the aluminum support bar by coating the lower surface of the at least one end of the aluminum support bar with silver or silver alloy." Additionally, claim 13 recites an aluminum support bar [headbar] where it's lower surface "comprises a highly electroconductive coating layer of silver or silver alloy." Seniuk et al. is clearly deficient in this respect, teaching only the coating of the copper contact button, and not the aluminum support bar, with silver. Furthermore, there is no teaching or suggestion in Seniuk et al. that would lead one of ordinary skill in the art to apply a silver coating to the contact surface of the aluminium support bar. Specifically, Seniuk et al. teaches:

> The main features of the above described method are silver plating and preheating of copper cones. Silver plating [of copper cones] is necessary for a strong electrical and metallurgical bond between copper and aluminum (col. 4, lines 59-62).

Seniuk et al. is primarily concerned the coating of copper surfaces, not aluminum. Furthermore, Seniuk et al. is concerned with the bond between the aluminum and the copper, and not the bond between the aluminum and silver.

Furthermore, as the Examiner admits, Seniuk et al. does not teach that a metallurgical bond is formed between the aluminum support bar and the highly electro-conductive material, as required by both independent claims 1 and 13. The Examiner has combined, among other references, Morin et al. with Seniuk et al., for allegedly teaching a substrate of aluminum or aluminum alloy where a copper silver coating is applied on the aluminum to provide an improved electrical contact. The Examiner does not explicitly contend that Murin et al. teaches a metallurgical bond between aluminum and the coating.

In the first instance, Morin et al. is directed to an aluminum pretreating process where the aluminum is pretreated with a zincate solution which includes zinc, nickel and copper ions (abstract). The purpose of this pretreating is to provide that "subsequent electroplating layers are sufficiently adherent so as to withstand a deformation process without causing delamination of the electroplated layers from the substrate" (paragraph [0010]). Thus, Morin et al. is essentially directed to the coating of aluminum not with silver or silver alloy, but with a layer of zincate. The Examiner cites to paragraph [0036], the lone paragraph which mentions electrical contact, which describes numerous and various applications of electroplated aluminum. The relevant application of electroplated aluminum set forth in paragraph [0036] of Morin et al. is as follows: "a copper-silver coating is used on aluminum to provide improved electrical contact."

Applicants respectfully submit that one of ordinary skill in the art would not read Morin et al. as a whole and extract this lone sentence as a basis to modify the teachings of Seniuk et al. to arrive at a method of coating an aluminum support bar with silver or silver alloy, for the following reasons. Firstly, as described above, there is no teaching, suggestion, or motivation in Seniuk et al. that would lead one of ordinary skill in the art to coat with silver the aluminum

support bar as opposed to the copper button. Secondly, Morin et al., when properly read as a whole, would direct and indeed require one of ordinary skill in the art to pretreat aluminum with a zincating solution. Accordingly, because of the presence of the zincate layer, a silver-copper coating as mentioned in paragraph [0036] would not be on the surface of the aluminum, and would certainly not form a tight metallurgical bond with the aluminum. As an additional note, Morin et al. does not teach a metallurgical bond between aluminum and copper. Thus, applicants respectfully submit that the combination of Morin et al. with Seniuk et al. fails to remedy the deficiencies as described above, and therefore the combination fails to teach each and every element of claims 1 and 13.

The Examiner further combines Gelfand with Seniuk et al. and Morin et al, contending that Gelfand teaches an aluminum electrode hanger contact with holes or slots having tin-coated copper inserted therein. The Examiner also contends that Gelfand teaches molten metal flowing into the hole, which secures the inserts. The Examiner, citing col. 4, lines 23-25 of Gelfand, states that "An aluminothermic process is used to fill the molten metal into the holes to secure the inserts."

The Examiner sets forth no teaching in Gelfand regarding the coating of an aluminum support bar [hanger bar] with silver or silver alloy. Indeed, there are no such teachings in Gelfand. Moreover, Gelfand neither teaches nor suggests the use of silver or silver alloy at all. In contrast, instant claims 1 and 13 require that the aluminum support bar is coated with a silver or silver-alloy coating. Accordingly, applicants respectfully submit that Gelfand bears no relevance to the instantly pending claims.

The Examiner further combines Deane et al. with Seniuk et al. and Morin et al., apparently only for the teaching of notching of the underside of the contact bar. The Examiner

contends that Deane et al. teaches copper contact pieces, which are notched and have a sufficient amount of metal material between the copper piece and the cathode header bar to prevent generation of heat at the currents for which the cell is designed. Applicants note that the copper contact pieces of Deane et al. "are preferably silver-plated prior to being welded to the aluminum header bars **35**" (col. 4, lines 18-20).

Again, as with Seniuk et al. further above, Deane et al. describes the coating of a copper contact piece with silver, but does not teach or suggest the coating of the aluminum support bar with silver or silver alloy. Furthermore, Deane et al. sets forth no teaching or suggestion of a metallurgical bond formed between silver and aluminum. Accordingly, applicants submit that Deane et al. fails to remedy the deficiencies of Seniuk et al. and Morin et al. as set forth above, and thus the combination fails to teach each and every element of claims 1 and 13.

Finally, the Examiner also combines Shibata with Seniuk et al. and Morin et al., contending that Shibata discloses an electrical contact composed of a base portion clad with a contact portion of Ag-SnO alloy. The Examiner states that "With respect to claim 3, Shibata specifically sets out the use of copper with tin and silver to be used as an electrical contact." In the first instance, applicants have cancelled claim 3, rendering this point moot. Furthermore, Shibata fails to disclose a metallurgical bond formed between the Ag-SnO alloy and the base portion. Finally, Shibata discloses a method whereby the contact portion is first joined to the base portion by cold press, and subsequently heat treated. In contrast, claim 1 (and 17) require that the support bar is coated with silver or silver alloy using thermal spraying. As described in the instant specification:

> Thermal spraying technique melts the surface material and since molten droplets of the silver-bearing coating have a high temperature, a metallurgical bond is generated between the aluminium and coating material in the coating of the support bar (page 7, lines 16-19).

Such a structural modification is not achieved through the cold press – heat treatment method of Shibata. Accordingly, applicants submit that Shibata fails to remedy the deficiencies of Seniuk et al. and Morin et al. as set forth above, and thus the combination fails to teach each and every element of claims 1 and 13.

In view of the foregoing, applicants submit that the combination of Seniuk et al., Morin et al., Gelfand, Deane et al., and Shibata neither teaches nor suggests each and every element of claims 1 and 13. Accordingly, applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a) over Seniuk et al. in view of Morin et al., Gelfand, Deane et al., and Shibata.

Response to Claim Objections

The Examiner has objected to claims 17 and 18 under 37 C.F.R. §1.75(c) as being in improper dependent for allegedly failing to further limit the subject matter of the previous claim. The Examiner contends that the manner in which the electroconductive coating layer is made does not further limit the previous claim because "apparatus claims rely on structure rather than methodical steps of producing." Applicants respectfully disagree.

Product-by process claim elements have long been held to further limit a structure (see MPEP 2113). In particular, MPEP 2113 cites *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) as:

> holding "interbonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.

Applicants respectfully assert that, analogous to *In re Garnero*, using a thermal spraying technique forms an electroconductive layer that is structurally different from an electro-conductive layer formed by any of the following methods: electroless plating as in Seniuk et al., electroplating as in Morin et al., an aluminothermic process as in Gelfand, welding as in Deane et al., and a cold press – heat treatment as in Shibata. Accordingly, applicants respectfully request withdrawal of the objection to claim 17.

Dependent Claims

Applicants have not independently addressed all of the rejections of the dependent claims. Applicants submit that for at least similar reasons as to why independent claims 1 and 13, from which all of the dependent claims 2, 4, 6-10, 12, 14, and 16-17 depend are believed allowable as discussed *supra*, the dependent claims are also allowable. Applicants however, reserve the right to address any individual rejections of the dependent claims and present independent bases for allowance for the dependent claims should such be necessary or appropriate.

Thus, applicants respectfully submit that the invention as recited in the claims as presented herein is allowable over the art of record, and respectfully request that the respective rejections be withdrawn.

CONCLUSION

Based on the foregoing amendments and remarks, the applicants respectfully request reconsideration and withdrawal of the pending rejections and allowance of this application. The applicants respectfully submit that the instant application is in condition for allowance.

In the event that a telephone conference would facilitate examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided. Favorable action by the Examiner is earnestly solicited.

AUTHORIZATION

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **13-4500**, Order No. 4819-4743.

Respectfully submitted,
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Dated: September 4, 2008

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